(c) DNA sequences which on expression code for a polypeptide coded for on expression by any of the foregoing DNA sequences and inserts.

38. The recombinant DNA molecule according to claim 37, wherein said DNA sequence (b) which hybridizes to said DNA insert (a) is selected from the group consisting of the hybridizing portion of each of:

HchrIF-A, the subcloned HindIII fragment of chr 3 in E.coli HB101;

HchrIF-B, the subcloned EcoRI fragment of chr 12 in E.coli HB101;

HchrIF-C, the subcloned HindIII fragment of chr 12 in E.coli HB101;

HchrIF-D, the subcloned EcoRI fragment of chr 13 in E.coli HB101;

HchrIF-E, the subcloned EcoRI fragment of chr 23 in E.coli HB101;

HchrIF-F, the subcloned HindIII fragment of chr 23 in E.coli HB101;

HchrIF-G, the subcloned EcoRI fragment of chr 26 in E.coli HB101; and

HchrIF-H, the subcloned HindIII fragment of chr 26 in E.coli HB101.

39. The recombinant DNA molecule according to claim 37 comprising a DNA sequence selected from the group consisting of DNA sequences of the formula:

ATGGCCTCGCCCTTTGCTTTACTGATGGTCCTGGTGGTGCTCAGCTGCAAGTCAAGC

TGCTCTCTGGGCTGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTG

ATGCTCCTGGCACAAATGAGCAGAATCTCTCCTTCCTCCTGTCTGATGGACAGACAT

GACTTTGGATTTCCCCAGGAGGAGTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCC
ATCTCTGTCCTCCATGAGCTGATCCAGCAGATCTTCAACCTCTTTACCACAAAAGAT
TCATCTGCTGCTTGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAG
CAGCTGAATGACTTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCC
CTGATGAATGCGGACTCCATCTTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTC
TATCTGACAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA
and
TGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTGATGCTCCTGGCA
CAAATGAGCAGAATCTCTCCTTCCTCCTGTCTGATGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCCATCTCTGTCCTC
CATGAGCTGATCCAGCAGATCTTCAACCTCTTTACCACAAAAGATTCATCTGCTGCT
TGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGAC
TTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCCCTGATGAATGCG
GACTCCATCTTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTCTATCTGACAGAG
AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA.

40. The recombinant DNA molecule according to claim 37 comprising a DNA sequence selected from the group consisting of DNA sequences of the formula:
TTACTGGTGGCCCTCCTGGTGCTCAGCTGCAAGTCAAGCTGCTCTGTGGGCTGTGAT
CTGCCTCAAACCCACAGCCTGGGTAGCAGGAGGACCTTGATGCTCCTGGCACAGATG
AGGAGAATCTCTCTTTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTTCCCCAG
GAGGAGTTTGGCAACCAGTTCCAAAAGGCTGAAACCATCCCTGTCCTCCATGAGATG
ATCCAGCAGATCTTCAATCTCTTCAGCACAAAGGACTCATCTGCTGCTTGGGATGAG
ACCCTCCTAGACAAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTGGAAGCC
TGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGACTCCATT
CTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTCTATCTGAAAGAGAAGAAATAC
AGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTTTCTTTGTCA
ACAAACTTGCAAGAAAGTTTAAGAAGTAAGGAA and

TGTGATCTGCCTCAAACCCACAGCCTGGGTAGCAGGAGGACCTTGATGCTCCTGGCA
CAGATGAGGAGAATCTCTCTTTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTTGGCAACCAGTTCCAAAAGGCTGAAACCATCCCTGTCCTCCAT
GAGATGATCCAGCAGATCTTCAATCTCTTCAGCACAAAGGACTCATCTGCTGCTTGG
GATGAGACCCTCCTAGACAAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTG
GAAGCCTGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGAC
TCCATTCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTCTATCTGAAAGAGAAG
AAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTTTCT
TTGTCAACAAACTTGCAAGAAAGTTTAAGAAGTAAGGAA

41. The recombinant DNA molecule according to claim 37 comprising a DNA sequence selected from the group consisting of DNA sequences of the formula:

ATGGCCCTGTCCTTTTCTTTACTGATGGCCGTGCTGGTGCTCAGCTACAAATCCATC
TGTTCTCTGGGCTGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTG
ATACTCCTGCAACAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACAT
GATTTCGGATTCCCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCC
ATCTCTGTCCTCCATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGAC
TCATCTGCTGCTTGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAG
CAACTGAATGACCTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCC
CTGATGAATGTGGACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTT
TATCTAACAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTCGTTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGAT

and

TGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTGATACTCCTGCAA
CAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACATGATTTCGGATTC
CCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCCATCTCTGTCCTC
CATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGACTCATCTGCTGCT
TGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAGCAACTGAATGAC
CTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCCCTGATGAATGTG
GACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTTTATCTAACAGAG

AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCGTTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGAT.

42. The recombinant DNA molecule according to claim 37, wherein said DNA sequence is operatively linked to an expression control sequence.

43. The recombinant DNA molecule according to claim 42, wherein said expression control sequence controls the expression of genes of prokaryotic or eukaryotic cells and their viruses.

44. The recombinant DNA molecule according to claim 43, wherein said expression control sequence is selected from the group consisting of a lac system, a ß-lac system, a trp system, major operator and promotor regions of phage λ, and the control region of fd coat protein.

45. The recombinant DNA molecule according to claim 37 selected from the group consisting of C8-IFN-α1, C8-IFN-α2, LAC-AUG(α2) and ß-lac-AUG(α2).

46. A host cell transformed with at least one recombinant DNA molecule according to claim 37.

47. The host cell of claim 46 selected from the group consisting of bacteria, yeasts, mouse or other animal hosts, and human tissue cells.

48. The transformed host cell according to claim 46 selected from the group consisting of E.coli HB101(Z-pBR322(Pst)/HcIF-II-206) and E.coli HB101 (Z-pBR322(Pst)/HcIF-SN35-AHL6).

49. The transformed host cell according to claim 46 selected from the group consisting of HchrIF-A, wherein HchrIF-A is the subcloned HindIII fragment of chr 3 in E.coli HB101; HchrIF-B, wherein HchrIF-B is the subcloned EcoRI fragment of chr 12 in E.coli HB101; HchrIF-C, wherein HchrIF-C is the subcloned HindIII fragment of chr 12 in E.coli HB101; HchrIF-D, wherein HchrIF-D is the subcloned EcoRI fragment of chr 13 in E.coli HB101; HchrIF-E, wherein HchrIF-E is the subcloned EcoRI fragment of chr 23 in E.coli HB101; HchrIF-F, wherein HchrIF-F is the subcloned HindIII fragment of chr 23 in E.coli HB101; HchrIF-G, wherein HchrIF-G is the subcloned EcoRI fragment of chr 26 in E.coli HB101; HchrIF-H, wherein HchrIF-H is the subcloned HindIII fragment of chr 26 in E.coli HB101; HchrIF-I, wherein HchrIF-I is the subcloned HindIII/BamHl fragment of chr 35 in E.coli HB101; and HchrIF-J, wherein HchrIF-J is the subcloned BamHI fragment of chr 35 in E.coli HB101.

50. The transformed host cell according to claim 46 selected from the group consisting of E.coli DS410 (C8-IFN-α1), E.coli DS410 (C8-IFN-α2), E.coli DS410 (LAC-AUG(α2)), E.coli DS410 HB101 (ßlac-AUG(α2)) and Mouse 3T3 (polyoma-Hif-chr35).

51. A method for producing a recombinant DNA molecule comprising the step of introducing into a cloning vehicle a DNA sequence selected from the group consisting of

(a) the DNA inserts of Z-pBR322(Pst)/HcIF-II-206 and Z-pBR322(Pst)/HcIF-SN35-AHL6,

(b) DNA sequences which hybridize to any of the foregoing DNA inserts and which code for a polypeptide of the IFN-α type and

(c) DNA sequences which on expression code for a polypeptide coded for on expression by any of the foregoing DNA sequences and inserts.

52. The method according to claim 51 comprising the additional step of introducing into said cloning vehicle an expression control sequence so as to permit expression of said DNA sequence.

53. A DNA sequence coding for an α-type interferon selected from the group consisting of DNA sequences of the formula:

ATGGCCTCGCCCTTTGCTTTACTGATGGTCCTGGTGGTGCTCAGCTGCAAGTCAAGC
TGCTCTCTGGGCTGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTG
ATGCTCCTGGCACAAATGAGCAGAATCTCTCCTTCCTCCTGTCTGATGGACAGACAT
GACTTTGGATTTCCCCAGGAGGAGTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCC
ATCTCTGTCCTCCATGAGCTGATCCAGCAGATCTTCAACCTCTTTACCACAAAAGAT
TCATCTGCTGCTTGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAG
CAGCTGAATGACTTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCC
CTGATGAATGCGGACTCCATCTTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTC
TATCTGACAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA

and

TGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTGATGCTCCTGGCA
CAAATGAGCAGAATCTCTCCTTCCTCCTGTCTGATGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCCATCTCTGTCCTC
CATGAGCTGATCCAGCAGATCTTCAACCTCTTTACCACAAAAGATTCATCTGCTGCT
TGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGAC
TTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCCCTGATGAATGCG
GACTCCATCTTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTCTATCTGACAGAG
AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA.

54. A DNA sequence coding for an α-type interferon selected from the group consisting of DNA sequences of the formula:

TTACTGGTGGCCCTCCTGGTGCTCAGCTGCAAGTCAAGCTGCTCTGTGGGCTGTGAT
CTGCCTCAAACCCACAGCCTGGGTAGCAGGAGGACCTTGATGCTCCTGGCACAGATG
AGGAGAATCTCTCTTTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTTCCCCAG
GAGGAGTTTGGCAACCAGTTCCAAAAGGCTGAAACCATCCCTGTCCTCCATGAGATG
ATCCAGCAGATCTTCAATCTCTTCAGCACAAAGGACTCATCTGCTGCTTGGGATGAG
ACCCTCCTAGACAAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTGGAAGCC
TGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGACTCCATT
CTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTCTATCTGAAAGAGAAGAAATAC
AGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTTTCTTTGTCA
ACAAACTTGCAAGAAAGTTTAAGAAGTAAGGAA and

TGTGATCTGCCTCAAACCCACAGCCTGGGTAGCAGGAGGACCTTGATGCTCCTGGCA
CAGATGAGGAGAATCTCTCTTTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTTGGCAACCAGTTCCAAAAGGCTGAAACCATCCCTGTCCTCCAT
GAGATGATCCAGCAGATCTTCAATCTCTTCAGCACAAAGGACTCATCTGCTGCTTGG
GATGAGACCCTCCTAGACAAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTG
GAAGCCTGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGAC
TCCATTCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTCTATCTGAAAGAGAAG

AAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTTTCT
TTGTCAACAAACTTGCAAGAAAGTTTAAGAAGTAAGGAA

55. A DNA sequence coding for an α-type interferon selected from the group consisting of DNA sequences of the formula:

ATGGCCCTGTCCTTTTCTTTACTGATGGCCGTGCTGGTGCTCAGCTACAAATCCATC
TGTTCTCTGGGCTGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTG
ATACTCCTGCAACAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACAT
GATTTCGGATTCCCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCC
ATCTCTGTCCTCCATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGAC
TCATCTGCTGCTTGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAG
CAACTGAATGACCTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCC
CTGATGAATGTGGACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTT
TATCTAACAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTCGTTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGAT

and

TGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTGATACTCCTGCAA
CAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACATGATTTCGGATTC
CCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCCATCTCTGTCCTC
CATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGACTCATCTGCTGCT
TGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAGCAACTGAATGAC
CTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCCCTGATGAATGTG
GACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTTTATCTAACAGAG
AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCGTTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGAT.

REMARKS

This application is a Rule 60 divisional application of pending application Serial No. 06/223,108